46

~~37~~. A permanent magnet turbogenerator/motor restarting system, comprising:

means for determining that the permanent magnet turbogenerator/motor has a fatal fault present and is in the process of shutting down;

means for determining that the permanent magnet turbogenerator/motor has more than a fixed number of restart attempts since the permanent magnet turbogenerator/motor was determined to have a fatal fault; and

means to continue shutdown of the permanent magnet turbogenerator/motor.

47

~~38~~. A permanent magnet turbogenerator/motor restarting system, comprising:

means for determining that the permanent magnet turbogenerator/motor has a fatal fault present and is in the process of shutting down;

means for determining that the permanent magnet turbogenerator/motor has less than a fixed number of restart attempts since the permanent magnet turbogenerator/motor was determined to have a fatal fault;

determining that the permanent magnet turbogenerator/motor is in a recharge state where an internal energy storage device is being recharged as part of the shutdown process;

means for determining that a fixed period of time has elapsed since any previous attempt to restart the permanent magnet turbogenerator/motor;

means to attempt to clear the fault present in the permanent magnet turbogenerator/motor;

means to issue a restart command to the permanent magnet turbogenerator/motor if the fatal fault is successfully cleared;

means to continue normal operation of the permanent magnet turbogenerator/motor.

48

39. A permanent magnet turbogenerator/motor restarting system, comprising:

means for determining that the permanent magnet turbogenerator/motor has a fatal present and is in the process of shutting down;:

means for determining that the permanent magnet turbogenerator/motor has less than a fixed number of restart attempts since the permanent magnet turbogenerator/motor was determined to have a fatal fault;

means for determining that the permanent magnet turbogenerator/motor is in a cooldown state where the turbogenerator/motor is being rotated when combustion has ceased to lower the internal temperature as part of the shutdown process and that the internal temperature is below a cooldown restart temperature;

means for determining that a fixed period of time has elapsed since any previous attempt to restart the permanent magnet turbogenerator/motor;

means to attempt to clear the fault present in the permanent magnet turbogenerator/motor;

means to issue a restart command to the permanent magnet turbogenerator/motor if the fatal fault is successfully cleared; and

means to continue normal operation of the permanent magnet turbogenerator/motor.

49

~~40~~. A permanent magnet turbogenerator/motor restarting system, comprising:

means for determining that the permanent magnet turbogenerator/motor has a fatal fault present and is in the process of shutting down;

means for determining that the permanent magnet turbogenerator/motor has less than a fixed number of restart attempts since the permanent magnet turbogenerator/motor was determined to have a fatal fault;

means for determining that the permanent magnet turbogenerator/motor is in a fault state;

means for determining that a fixed period of time has elapsed since any previous attempt to restart the permanent magnet turbogenerator/motor;

means to attempt to clear the fault present in the permanent magnet turbogenerator/motor;

means to issue a restart command to the permanent magnet turbogenerator/motor if the fatal fault is successfully cleared; and

means to continue normal operation of the permanent magnet turbogenerator/motor.

50

~~41~~. A permanent magnet turbogenerator/motor restarting system, comprising:

means for determining that the permanent magnet turbogenerator/motor has a fatal fault present and is in the process of shutting down;

means for determining that the permanent magnet: turbogenerator/motor has less than a fixed number of restart attempts since the permanent magnet turbogenerator/motor was determined to have a fatal fault;

means for determining that the permanent magnet turbogenerator/motor is in a standby state;

means to issue a restart command to the permanent magnet turbogenerator/motor; and

means to continue normal operation of the permanent magnet turbogenerator/motor.

51

~~42~~. A permanent magnet turbogenerator/motor restarting system, comprising:

means for determining that the permanent magnet turbogenerator/motor has a fatal fault present and is in the process of shutting down;

means for determining that the permanent magnet turbogenerator/motor has less than a fixed number of restart attempts since the permanent magnet turbogenerator/motor was determined to have a fatal fault;

means for determining that the permanent magnet turbogenerator/motor is in a recharge state where an internal energy storage device is being recharged as part of the shutdown process;

means for determining that a fixed period of time has not elapsed since any previous attempt to restart the permanent magnet turbogenerator/motor;

means to continue shutdown of the permanent magnet turbogenerator/motor.

52

~~43~~. A permanent magnet turbogenerator/motor restarting system, comprising:

means for determining that the permanent magnet turbogenerator/motor has a fatal fault present and is in the process of shutting down;

means for determining that the permanent magnet turbogenerator/motor has less than a fixed number of restart attempts since the permanent magnet turbogenerator/motor was determined to have a fatal fault;

means for determining that the permanent magnet turbogenerator/motor is in a cooldown state where the turbogenerator/motor is being rotated when combustion has ceased to lower the internal temperature as part of the shutdown process and that the internal temperature is below a cooldown restart temperature;

means for determining that a fixed period of time has elapsed since any previous attempt to restart the permanent magnet turbogenerator/motor;

means to attempt to clear the fault present in the permanent magnet turbogenerator/motor;

and

means to continue shutdown of the permanent magnet turbogenerator/motor when the fault is not cleared.

53. ~~44.~~ A permanent magnet turbogenerator/motor restarting system, comprising:

means for determining that the permanent magnet turbogenerator/motor has a fatal fault present and is in the process of shutting down.

means for determining that the permanent magnet turbogenerator/motor has less than a fixed number of restart attempts since the permanent magnet turbogenerator/motor was determined to have a fatal fault;

means for determining that the permanent magnet turbogenerator/motor is in a fault state;

means for determining that a fixed period of time has elapsed since any previous attempt to restart the permanent magnet turbogenerator/motor;

means to attempt to clear the fault present in the permanent magnet turbogenerator/motor; and

means to continue shutdown of the permanent magnet turbogenerator/motor when the fault is not cleared.

~~45~~ 54. The permanent magnet turbogenerator/motor restarting system of claim ~~44~~ 538 wherein said means for determining that the permanent magnet turbogenerator/motor has a fatal fault present and is in the process of shutting down, comprises:

means for detecting no output over-current;

means for detecting a loss of output current control or a loss of DC bus voltage control;

means for determining that less than a fixed number of warning faults has occurred within a fixed period of time;

means for reporting a grid unbalance warning fault;

means for disabling the output power converter of the permanent magnet turbogenerator/motor;

means for analyzing the grid voltage magnitude and frequency for an unacceptable connection;

means for determining that the maximum allowable reconnection time has not expired;

means for determining that the DC bus level is not below the turn on point of the brake resistor,

means for applying the brake resistor to control DC bus voltage;

means for determining that the grid is acceptable for connection; and